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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/803,004	03/17/2004	Thomas Berkey	C4-1208	4388
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EXAMINER WERNER, DAVID N				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/803,004

Applicant(s)

BERKEY ET AL.

Examiner

David N. Werner

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,10-12,14,16-18 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,10-12,14,16-18 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office action for U.S. Patent 10/803,004 is responsive to communications filed 20 February 2009, in reply to the Non-Final Rejection of 20 November 2008. Currently, Claims 1, 3-7, 10-12, 14, 16-18, and 21-24 are pending.
2. In the previous Office action, Claims 1, 4-7, 10-14, 17-19, and 21-24 are rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent 5,185,667 A (Zimmermann) in view of Japanese Patent Application Publication 特開10-134,187 A (House). Claims 3 and 16 were rejected under 35 U.S.C. 103(a) as obvious over Zimmermann in view of House and in view of U.S. Patent 5,414,521 (Ansley).

Response to Arguments

3. Applicant's arguments filed with respect to claim 1 have been fully considered but they are not persuasive. Applicant states that the Zimmermann and House references do not disclose the claimed transformation of "distorted wide image data" into "substantially undistorted image data", and the claimed "real time" production of an encoded output signal.

First, regarding the claimed correction of distorted data, Zimmerman is described as transforming a distorted "hemispherical field-of-view image into a non-distorted, normal perspective image" (column 1: lines 7-9). Figure 2 shows an illustration of a source distorted wide-field 180 degree image, and figure 3 shows an illustration of a corrected undistorted narrow field image. Considering this, it is respectfully submitted

that the Zimmermann reference clearly shows the claimed transformation from distorted image data to undistorted image data.

Second, regarding the claimed "real-time" processing and output, Applicant states in pages 8 and 9 that since the House reference does not explicitly state that the output from the picture mapping device in the House reference is not buffered, the output somehow inherently must be buffered or delayed, and so cannot read on the claimed buffer-less output. In other words, it appears that Applicant is stating that since it is unproven that the output of House is real-time, it therefore must not be. Although this type of reasoning may be valid with a positive claim limitation, in a negative claim limitation, it is respectfully submitted that in House, figure 1 shows a direct output of the depth picture from picture mapping device 12, with no buffering. Then, House explicitly discloses the claimed "undistorted image data not being stored in a buffer from the time of transformation by the image data processor until the time said encoder produces an output signal".

Considering the above, the rejections of the claims are maintained.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-7, 10-12, 14, 17, 18, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,185,667 A (Zimmermann) in view of Japanese Laid-Open Patent Application 特開10-134,187 A (House).

Zimmermann teaches an omnidirectional (wide-angle) imaging system. Regarding claim 1, figure 1 illustrates the system of Zimmermann. Image buffer 4 receives images (column 3: line 31) having a 180-degree field of view (column 3: line 28). This panoramic image, shown in figure 2, comprises the claimed "distorted wide angle image data". Image processing system consisting of X-Map 6 and Y-Map 7, coupled to image buffer 4, perform a transform of the image data (column 3: lines 32-35), corresponding with the claimed "image data processor", and display driver 10 scans the transformed images for display (column 3: line 47), corresponding with the claimed "encoder". This transformation is performed on the basis of transforming "object points" having (u,v) coordinates to "image points" having (x,y) coordinates (column 5: lines 39-46; column 7: lines 53-62). Then, the output image shown in figure 3 is the claimed "substantially undistorted image data". However, the present invention describes outputting corrected image data in real time "upon completion of each pixel transformation", while Zimmermann may or may not re-buffer transformed image data into image buffer 4.

House teaches a three-dimensional imaging apparatus. Regarding claim 1, as shown in figure 1 of House, a wide visual field picture 5 and narrow visual field picture 6, from two separate cameras 3 and 4 (paragraphs 0037-0038), are inputted to depth picture formation section 9. Mapping of each pixel is performed to determine the depth

of the pixels, and each pixel depth is output directly "to the outside" as data in a depth picture 11 (paragraph 0064) without additional buffering. This direct pixelwise output encompasses the claimed production of an output signal comprising the "substantially undistorted image data" "substantially in real time" without being stored in a buffer. In one embodiment, shown in figure 3, the pixels from the narrow field vision field picture 6 are pruned to match the narrow picture to the wide picture (paragraphs 0068-0069). However, in another embodiment, shown in figure 4, the pixels of the wide vision field picture 5 are interpolated to match to the size of the narrow vision field picture 6 (paragraphs 0076-0077). This corresponds with the claimed pixelwise transform of "wide angle image data". This expansion of wide-picture pixel data to create a three-dimensional "depth picture" (paragraph 0078) and construct the three-dimensional structure of the vision field of the cameras (paragraph 0079).

Zimmermann discloses the invention except for performing a pixelwise transformation and directly outputting the results on a pixel-by-pixel basis. House teaches that it was known to output pixel mapping data directly upon processing a wide angle picture. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to directly output image mapping data pixelwise without an output buffer, as taught by House, since it has been held that the omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. See *In re Karlson*, 136 USPQ 184.

Regarding claims 4 and 5, the image processing system of Zimmermann is coupled to microcomputer control interface 5, which communicates user-determined transformation coefficients based on input from an input means such as joystick 12 (column 3: lines 35-43). Regarding claim 6, "X-MAP and Y-MAP transform processors 6 and 7...can be accomplished with application specific integrated circuits or other means as will be known to persons skilled in the art" (column 4: lines 1-5).

Regarding claims 7 and 10, camera 2 is a source of distorted wide-angle image data (column 3: line 29). Regarding claim 11, Zimmermann outputs data in NTSC format (column 2: lines 25-29). The examiner takes Official Notice that it was well within the level of ordinary skill in the art at the time the invention was made to output video in PAL or SECAM format if NTSC output was possible. Regarding claim 12, video is output to display device 11 (column 3: line 47).

Regarding claim 14, in Zimmermann, transformation circuits 6 and 7 transform the distorted wide-angle image data into corrected image data, display driver 10 encodes the corrected image data, and display device 11 displays output signals. Regarding claims 17 and 18, input means 12 provide user image command data to image processors 6 and 7 through microcomputer 5 to transform the buffered wide-angle image into corrected image data, based on calculated parameters determined from user command data.

Regarding claim 21, this claim is in means-plus-function format, complying with 35 U.S.C. 112, sixth paragraph. Then, the subject matter of claim 21 is limited to that as described in the specification. In Zimmermann, X-map 6 and Y-map 7 correspond

with the "means for transforming", and display driver 10, modified to produce a direct pixelwise output as in House, corresponds with the "means for encoding".

Regarding claims 22-24, Zimmermann et al. teaches a variable zoom function "that allows a change in the field of view of the output image" (column 4: lines 61-63).

6. Claims 3 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of House as applied to claims 1 and 14 above, and further in view of US Patent 5,414,521 (Ansley). Claims 3 and 16 are directed to performing a transformation calculation based on a look-up table. Zimmerman does not disclose this feature.

Ansley teaches an image distortion correction system for a flight simulator. In Ansley, an image is displayed on a curved dome screen. As the pilot's viewing angle changes, distortion becomes apparent and must be mitigated (column 6: lines 3-8). Regarding claims 3 and 16, a computer determines the field of view and viewing angle of the pilot for every possible type of motion for the simulator (column 6: lines 23-35), and determines a set of correction coefficients to eliminate distortion during this motion. These coefficients are stored in a look-up table memory (column 6: lines 35-39). When a certain viewing angle and field of view is received, the look-up memory provides the appropriate coefficients to correct the distortion (column 6: lines 39-66).

Zimmermann, in combination with House, discloses the claimed invention except for calculating a distortion correction based on a look-up table. Ansley teaches that it was known to store pre-calculated image distortion correction coefficients in a look-up

table memory. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to perform an image correction calculation based on data in a look-up table, as taught by Ansley, since Ansley states in column 6, lines 66-68 that such a modification would greatly increase the speed of a distortion correction process, since the pre-computed values do not have to be re-determined for each new frame.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Dave Czekaj/
Primary Examiner, Art Unit 2621